Alaris® TIVA Syringe Pump

Directions For Use

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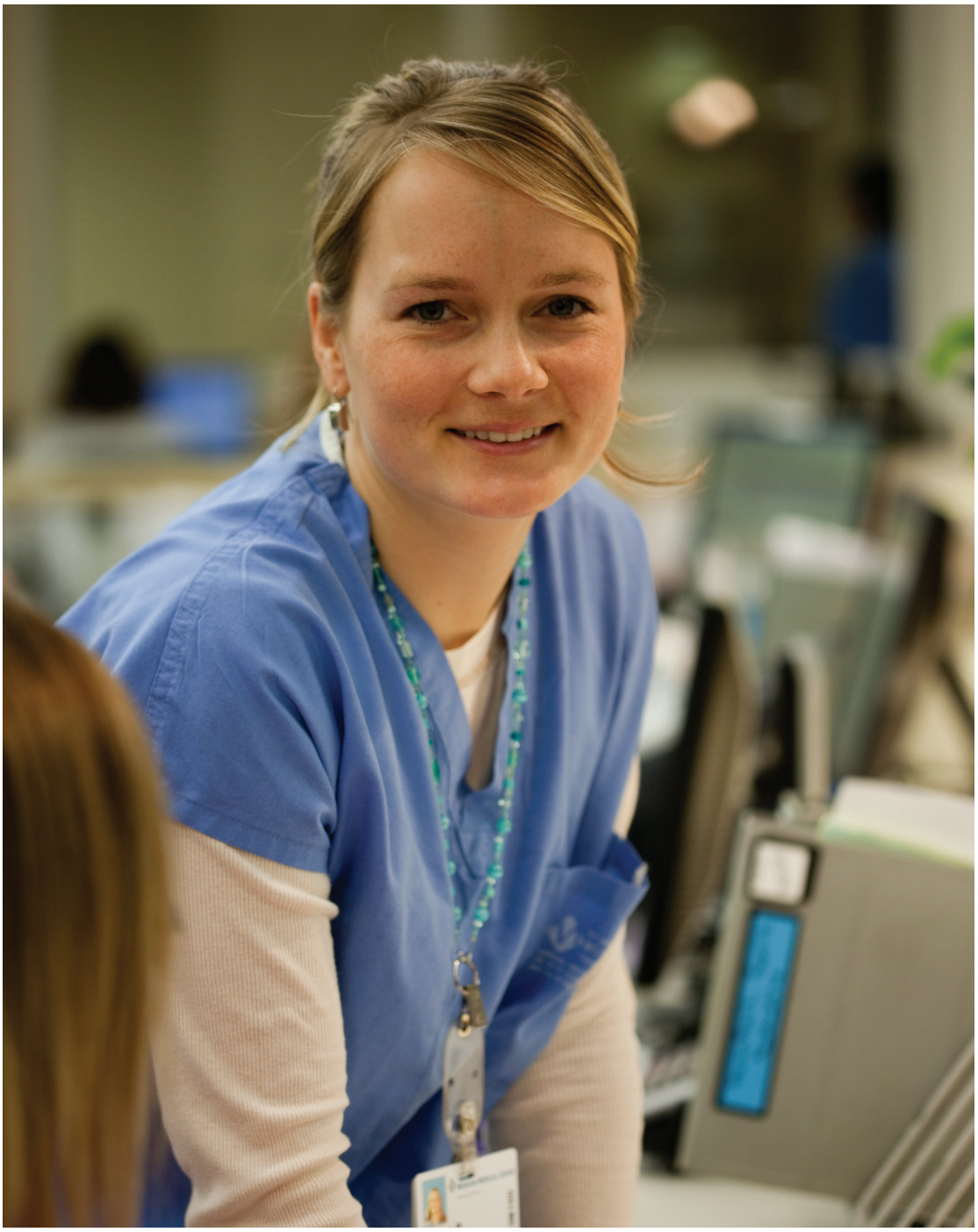

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CareFusion

Contents

Introduction

The Alaris® TIVA Syringe Pump (herein after referred to as "pump") is a fully featured syringe pump which provides the anaesthetist with a pump which has been designed to work in the way drugs are delivered in the operating theatre, including dose based calculations of induction and maintenance rates.

The Alaris® TIVA Syringe Pump is compatible with a wide range of standard, single-use, disposable Luer lock syringes. It accepts syringe sizes from 5 ml to 50 ml. See the 'Compatible Syringes' section for a full list of compatible syringes.

Intended Purpose

The Alaris® TIVA Syringe Pump is intended for use by medical staff for purposes of controlling infusion rate and volume.

Conditions of Use

The Alaris® TIVA Syringe Pump should only be operated by a clinician competent in use of automated syringe pumps and post-placement management of intravenous catheters.

CareFusion cannot guarantee the continued system accuracy with other manufacturer's syringes as identified in the 'Compatible Syringes' table. Manufacturers may change syringe specification significant to system accuracy without prior notification.

Indications

The Alaris® TIVA Syringe Pump is indicated for infusion of therapeutics including:

- analgesics
- antimicrobials
- blood products
- chemotherapy
- subcutaneous
- nutrition

Contraindications

The Alaris® TIVA Syringe Pumps is contraindicated for:

- enteral therapies
- epidural

About This Manual

The user must be thoroughly familiar with the Alaris® TIVA Syringe Pump described in this manual prior to use.

All illustrations used in this manual show typical settings and values which may be used in setting up the functions of the pump. These settings and values are for illustrative use only. Where stated, a minimum infusion rate refers to a nominal rate of 1.0ml/h, and an intermediate infusion rate refers to a nominal rate of 5.0ml/h. The complete range of infusion rates, settings and values are shown in the Specifications section.

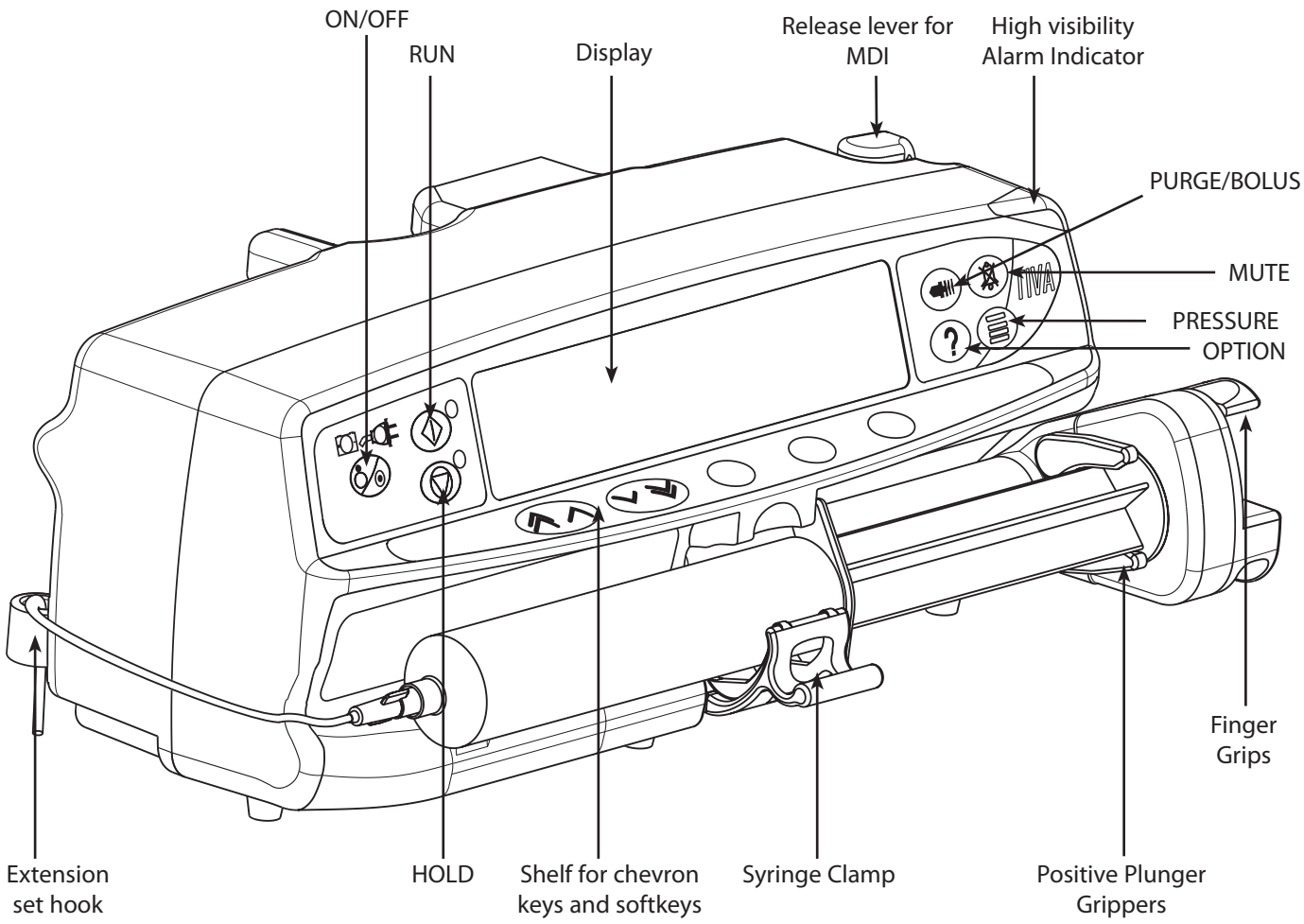
Quick Start Guide

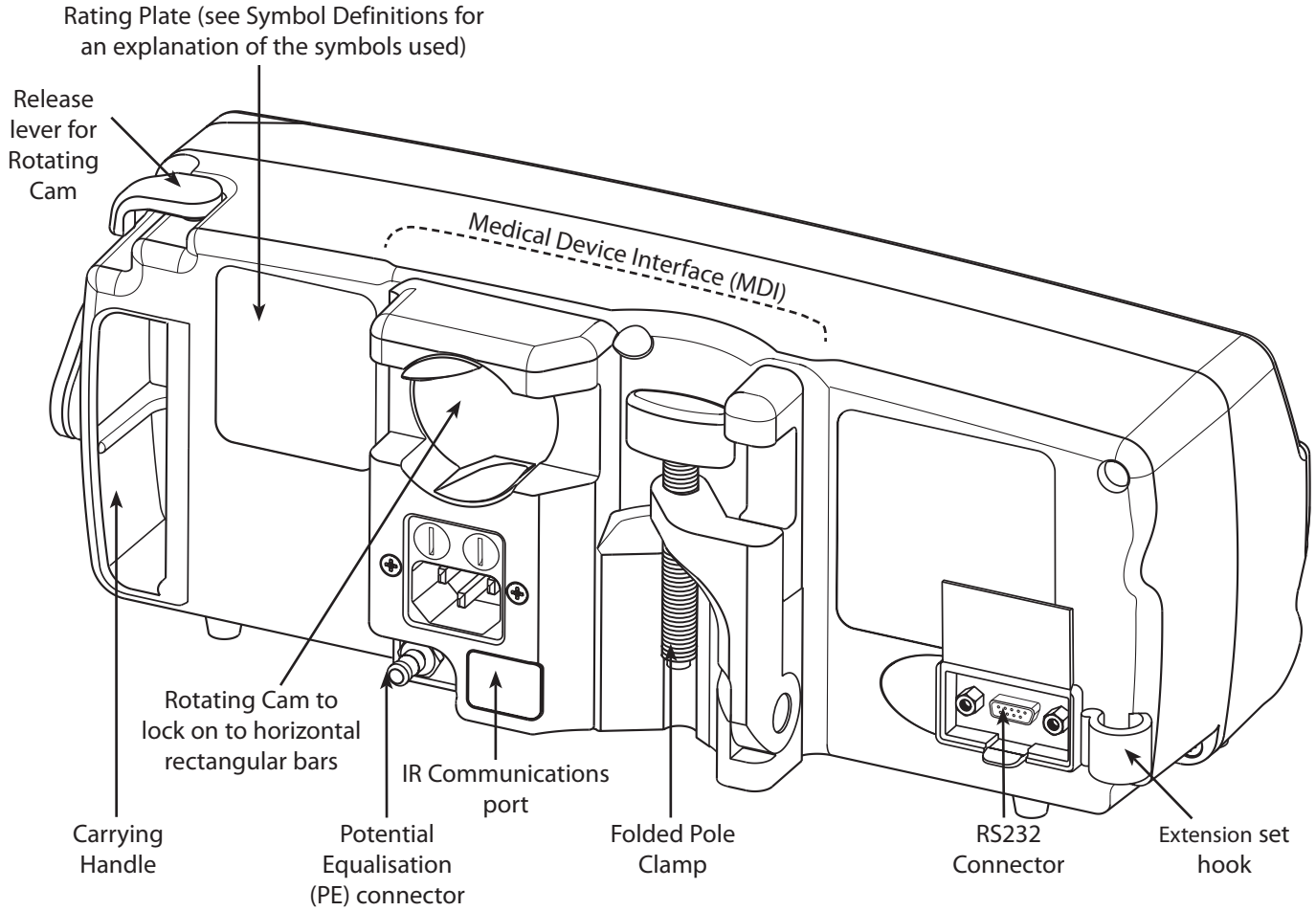
1. Press the button to turn the pump on.
2. **NEW DRUG - NO** retains previous drug data. **YES** clears previous drug data.
3. Select drug.
4. Enter patient weight.
5. Confirm protocol.
6. Load syringe.
7. Confirm correct size and brand of syringe.
8. Ensure extension set is attached to syringe, but disconnected from patient.

If the PURGE SYRINGE option has been enabled then the prompt to purge screen is displayed and the set can be purged as required.

9. INFUSION RATE - Change rate if necessary using the keys.
10. PURGE - Press the button followed by the **PURGE** softkey.
11. Connect extension set to the patient access device.
12. Press the button to start the infusion.

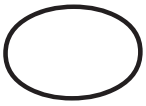
Features of the Alaris® TIVA Syringe Pump



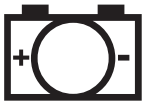
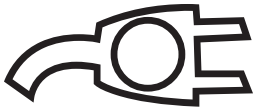


Controls & Indicators

Controls:

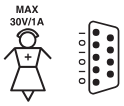
Symbol	Description
	**ON/OFF** button - Press once to switch the pump ON. Press and hold down for 3 seconds to switch the pump OFF.
	**RUN** button - Press to start the infusion. The green LED will flash during infusion.
	**HOLD** button - Press to put the infusion on hold. The amber LED will be lit while on hold.
	**MUTE** button - Press to silence alarm for 2 minutes (configurable). The alarm will resound after this time. Press and hold until 3 beeps are heard for 60 minutes silence.
	**PURGE/BOLUS** button - Press to access **PURGE** or **BOLUS** soft keys. Press and hold down soft key to operate. **PURGE** the extension set during set up. • Pump is on hold • Extension set is not connected to the patient • Volume Infused (VI) is not added **BOLUS -** fluid or drug delivered at an accelerated rate. • Pump is infusing • Extension set is connected to the patient • VI is added
	**OPTION** button - Press to access optional features (see Basic Features).
	**PRESSURE** button - Use this button to display the pumping pressure and alarm level.
	**CHEVRON** keys - Double or single for faster/slower increase or decrease of values shown on display.
	**BLANK SOFTKEYS** - Use in conjunction with the prompts shown on the display.

Indicators:

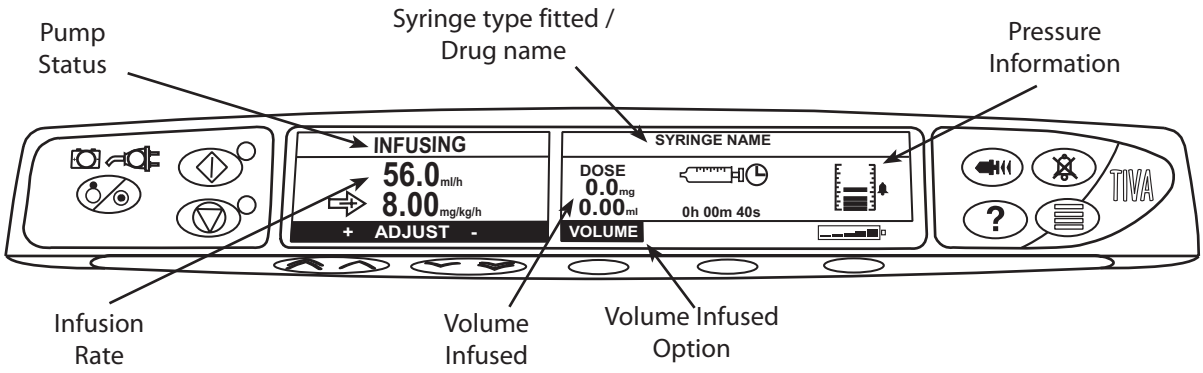
Symbol	Description
	**BATTERY** indicator - When illuminated the pump is running on the internal battery. When flashing the battery power is low with less than 30 minutes of use remaining.
	**AC POWER** indicator - When illuminated the pump is connected to an AC power supply and the battery is being charged.

Symbol Definitions

Labelling Symbols:

Symbol	Description
	Attention (Consult accompanying documents)
	Potential Equalisation (PE) Connector
	RS232/Nurse call Connector (Optional)
	Defibrillation-proof type CF applied part (Degree of protection against electrical shock)
IPX1	Protected against vertically falling drops of water
	Alternating Current
CE 0086	Device complies with the requirements of Council Directive 93/42/EEC as amended by 2007/47/EC.
	Date of Manufacture
	Manufacturer
	Not for Municipal Waste
	Fuse Rating
	Important information
EC REP	Authorised representative in the European Community

Main Display Features



Screen Icons:

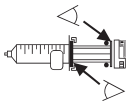
Symbol	Description
00:00	**TIME REMAINING DISPLAY** icon - Indicates time before syringe will require replacing.
	BATTERY icon - Indicates battery charge level to highlight when the battery will require recharging.
	Induction Phase Dose (Displayed on protocol confirmation screen)
	Duration of Induction Phase (Displayed on protocol confirmation screen)
	Duration of Hands Free Bolus (Displayed in bolus set-up screen)
	Maintenance Phase Dose Rate (Displayed on protocol confirmation screen)

Operating Precautions

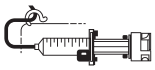
Disposable Syringes and Extension Sets

- Always clamp or otherwise isolate the patient line before unclamping or removing a syringe from the pump. Failure to do so may result in unintended administration.

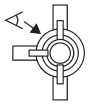
- This Alaris® TIVA Syringe Pump has been calibrated for use with single-use disposable syringes. To ensure correct and accurate operation, only use 3 piece Luer lock versions of the syringe make specified on the pump or described in this manual. Use of non-specified syringes or extension sets may impair the operation of the pump and the accuracy of the infusion.



- Uncontrolled flow or syphoning may result if the syringe is located incorrectly in the pump, or if it is removed from the pump before the extension set is properly isolated from the patient. Isolation may include closing a tap in the patient line or activating a flow stop clamp.

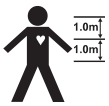


- Secure the extension set to the pump using the extension set hook at the rear of the pump. This provides protection against accidental dislodging of the syringe from the pump.



- When combining several apparatus and/or instruments with extension sets and other tubing, for example via a 3-way tap, the performance of the pump may be impacted and should be monitored closely.

Mounting the Pump



- The pump must be mounted within 1.0m above or below the patient's heart. The most accurate pressure monitoring in the extension set is achieved when the pump is positioned close to the patients heart level.

- Do not mount the pump in a vertical position with the syringe pointing upwards as this could lead to an infusion of air which may be in the syringe. To protect against the introduction of air the user should regularly monitor the progress of the infusion, syringe, extension line and patient connections and follow the priming procedure specified herein.

Operating Environment

- When using any infusion pump in conjunction with other pumps or devices requiring vascular access, extra care is advised. Adverse delivery of medication or fluids can be caused by the substantial variation in pressures created within the local vascular system by such pumps. Typical examples of those pumps are used during dialysis, bypass or cardiac assist applications.

- This pump is suitable for use in Hospital and clinical environments other than domestic establishments and those directly connected to the public single phase AC mains power supply network that supplies buildings used for domestic purposes. However, it may be used in domestic establishments under the supervision of Medical professionals with additional necessary appropriate measures. (Consult Technical Service Manual, appropriately trained technical personnel or CareFusion for further information).

- This pump is not intended to be used in the presence of a flammable anaesthetic mixture with air or oxygen or nitrous oxide.

Operating Pressure

- This is a positive pressure pump designed to achieve very accurate fluid administration by automatically compensating for resistance encountered in the infusion system.

- The pumping pressure alarm system is not designed to provide protection against, or detection of, IV complications which can occur.

Alarm Conditions

- Several alarm conditions detected by this pump will stop the infusion and generate visual and audible alarms. Users must perform regular checks to ensure that the infusion is progressing correctly and no alarms are operating.

Electromagnetic Compatibility and Interference

- This pump is protected against the effects of external interference, including high energy radio frequency emissions, magnetic fields and electrostatic discharge (for example, as generated by electrosurgical and cauterising equipment, large motors, portable radios, cellular telephones etc.) and is designed to remain safe when unreasonable levels of interference are encountered.
- Therapeutic Radiation Equipment: Do not use the pump in the vicinity of any Therapeutic Radiation Equipment. Levels of radiation generated by the radiation therapy equipment such as Linear Accelerator, may severely affect functioning of the pump. Please consult manufacturer's recommendations for safe distance and other precautionary requirements. For further information, please contact your local CareFusion representative.
- Magnetic Resonance Imaging (MRI): The pump contains ferromagnetic materials which are susceptible to interference with magnetic field generated by the MRI devices. Therefore, the pump is not considered an MRI compatible pump as such. If use of the pump within an MRI environment is unavoidable, then CareFusion highly recommends securing the pump at a safe distance from the magnetic field outside the identified 'Controlled Access Area' in order to evade any magnetic interference to the pump; or MRI image distortion. This safe distance should be established in accordance with the manufacturers' recommendations regarding electromagnetic interference (EMI). For further information, please refer to the product technical service manual (TSM). Alternatively, contact your local CareFusion representative for further guidance.
- Accessories: Do not use any non-recommended accessory with the pump. The pump is tested and compliant with the relevant EMC claims only with the recommended accessories. Use of any accessory, transducer or cable other than those specified by CareFusion may result in increased emissions or decreased pump immunity.
- This pump is a CISPR 11 Group 1 Class A device and uses RF energy only for its internal function in the normal product offering. Therefore, its RF emissions are very low and are not likely to cause any interference with the nearby electronic equipment. However, this pump emits a certain level of electromagnetic radiation which is within the levels specified by IEC/EN60601-1-2 and IEC/EN60601-2-24. If the pump interacts with other equipment, measures should be taken to minimise the effects, for instance by repositioning or relocation.

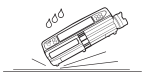
- In some circumstances the pump may be affected by an electrostatic discharge through air at levels close to or above 15kv; or by radio frequency radiation close to or above 10v/m. If the pump is affected by this external interference the pump will remain in a safe mode; the pump will duly stop the infusion and alert the user by generating a combination of visual and audible alarms. Should any encountered alarm condition persist even after user intervention, it is recommended to replace that particular pump and quarantine the pump for the attention of appropriately trained technical personnel. (Consult Technical Service Manual for further information).

Hazards

- An explosion hazard exists if the pump is used in the presence of flammable anaesthetics. Exercise care to locate the pump away from any such hazardous sources.

- Dangerous Voltage: An electrical shock hazard exists if the pump's casing is opened or removed. Refer all servicing to qualified service personnel.
- When connected to an external power source, a three-wire (Live, Neutral, Earth) supply must be used. If the integrity of the external protective conductor in the installation or its arrangement is in doubt, the pump should be operated from the battery.

- Do not open the RS232/Nurse Call protective covering when not in use. Electrostatic discharge (ESD) precautions are required when connecting RS232/Nurse Call. Touching the pins of the connectors may result in ESD protection failure. It is recommended that all actions must be taken by appropriately trained personnel.



- If this pump is dropped, subjected to excessive moisture, fluid spillage, humidity or high temperature, or otherwise suspected to have been damaged, remove it from service for inspection by a qualified service engineer. When transporting or storing the pump, use original packaging where possible, and adhere to temperature, humidity and pressure ranges stated in the Specifications section and on the outer packaging.

Getting Started

Initial Set-up

Before operating the pump read this Directions For Use manual carefully.

1. Check that the pump is complete, undamaged and that the voltage rating specified on the label is compatible with your AC power supply.
2. Items supplied are:
   - ***Alaris® TIVA Syringe Pump***
   - ***User Support CD (Directions For Use)***
   - ***AC Power Cable (as requested)***
   - ***Protective Packaging***
3. Connect the pump to the AC power supply for at least 2½ hours to ensure that the internal battery is charged (verify that the is lit).

Language Selection

1. On initial start-up the pump will display the Select Language screen.
2. Select the required language from the list displayed using the keys.
3. Press the **OK** softkey to confirm your selection.

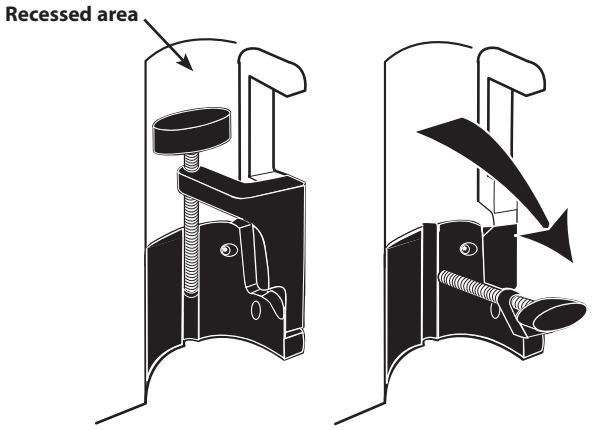
The pump will automatically operate from its internal battery if the pump is switched on without being connected to the AC power supply.

Should the pump fail to perform correctly, replace in its original protective packaging, where possible and contact a qualified service engineer for investigation.

Do not mount the pump with the AC power inlet or the syringe pointing upwards. This could affect the electrical safety in the event of a fluid spill or lead to the infusion of air which may be in the syringe.

Pole Clamp Installation

The pole clamp is fitted to the rear of the pump and will provide secure fixing to vertical I.V. poles of a diameter between 15 and 40 mm.

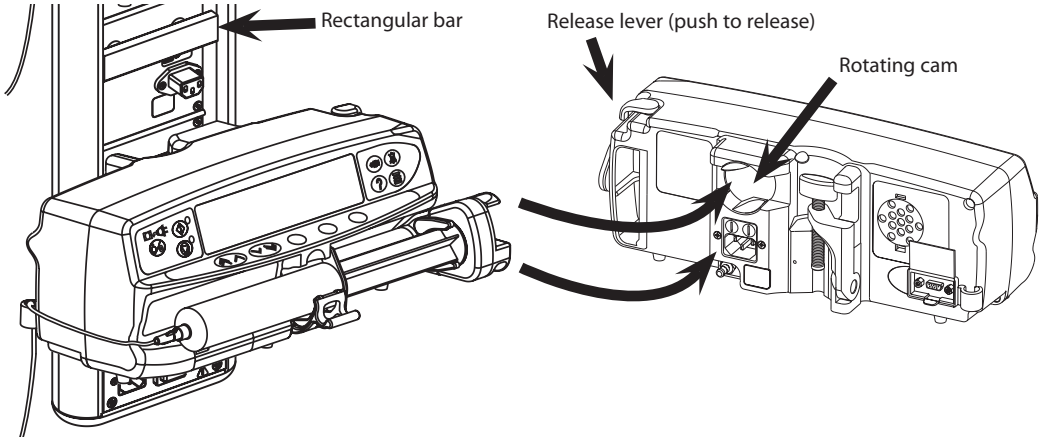


1. Pull the folded pole clamp towards you and unscrew the clamp to leave enough room for the size of the pole.
2. Place pump around pole and tighten screw until the clamp is secured to the pole.

Ensure the pole clamp is folded away and stored within the recessed area at the rear of the pump before connecting to a Docking Station/Workstation* or when not in use.

Never mount the pump such that the IV infusion stand becomes top heavy or unstable.

Docking Station/Workstation* or Equipment Rail Installation



The rotating cam can be fitted to the rectangular bar on the Docking Station/Workstation* or the equipment rail measuring 10 by 25 mm.

1. Align the rotating cam on the rear of the pump with the rectangular bar on the Docking Station/Workstation* or the equipment rail.
2. Hold the pump horizontally, push the pump firmly onto the rectangular bar or equipment rail.
   Ensure that the pump 'clicks' securely into position onto the bar.
3. To release, push the release lever and pull the pump forwards.

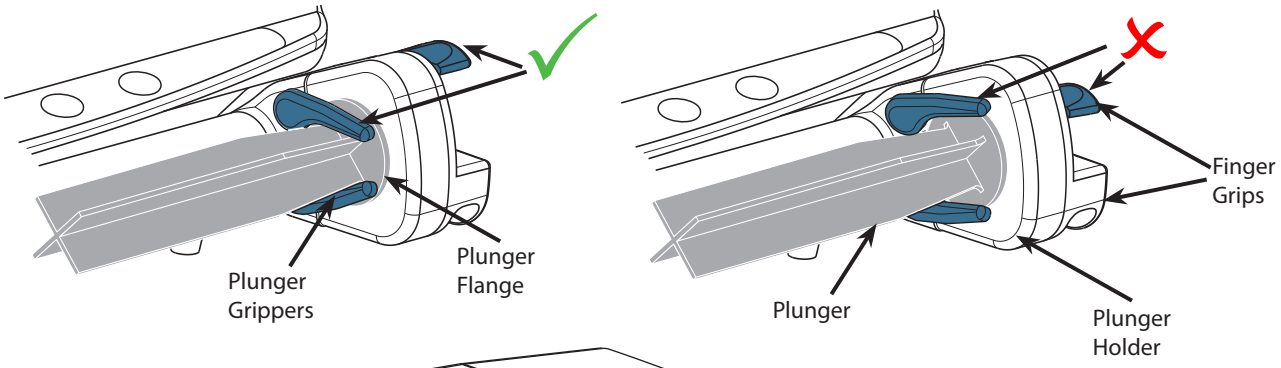
*Alaris® DS Docking Station and Alaris® Gateway Workstation.

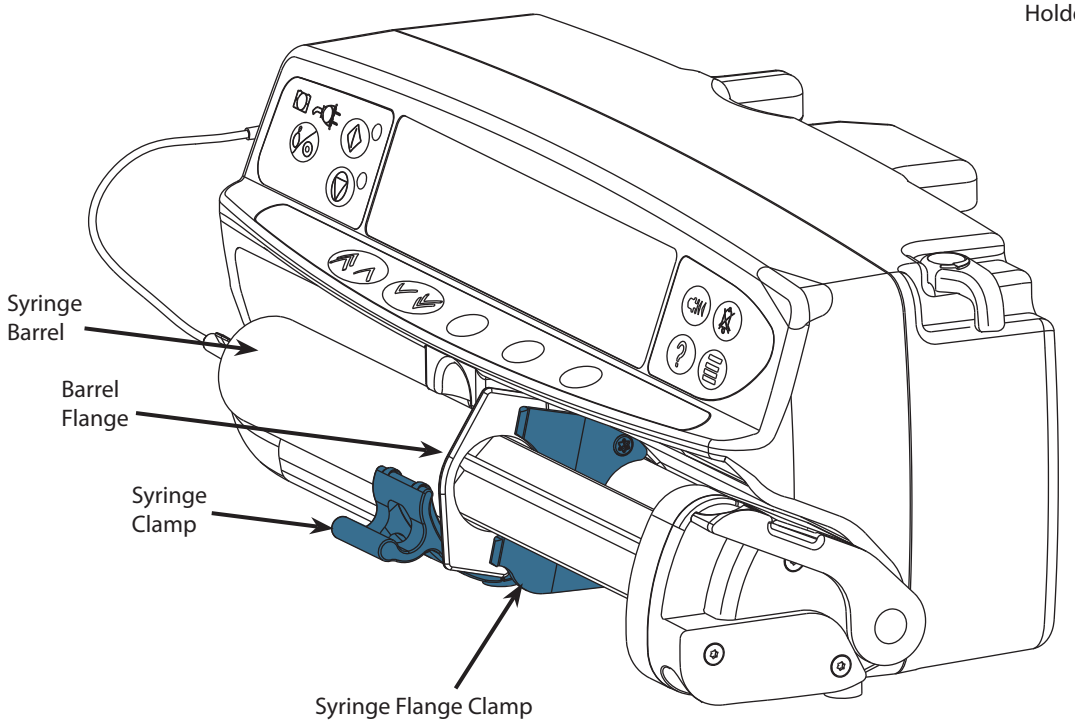
Loading and Confirming a Syringe

Warning: To securely load and confirm a syringe carefully follow the steps below. An incorrect loading of a syringe may result in misidentification of the syringe type and size. If then confirmed, this may lead to significant inaccuracy of the infusion rate and may also affect pump performance.

Only use a syringe of the type stated on the pump or in this manual. Using an incorrect syringe could adversely affect the accuracy of the infusion rate and may also affect pump performance.

When drawing fluid into the syringe, draw enough to compensate for any 'dead space' volume in the extension set and syringe at the end of infusion as this cannot be fully infused.

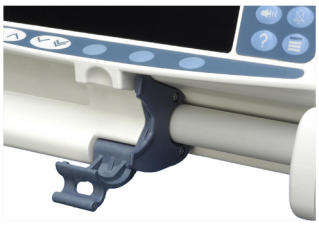




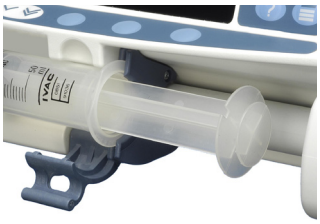
Place the pump on a stable horizontal surface or secure as described previously.

Prepare, load and prime the single-use disposable syringe and extension set using standard aseptic techniques.

1. Squeeze the finger grips together on the plunger holder and slide the mechanism to the right.
2. Pull the syringe clamp forward and down.

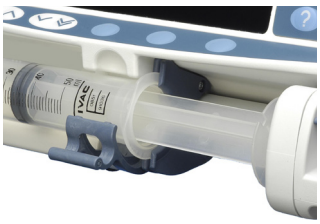


3. Insert the syringe ensuring that the barrel flange is located in the slots on the syringe flange clamp.

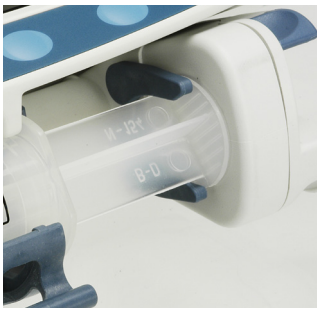


To ensure the syringe is loaded correctly, place the barrel flange in the space between the syringe clamp and the syringe flange clamp. This is correct if the syringe remains in position before the syringe clamp is closed.

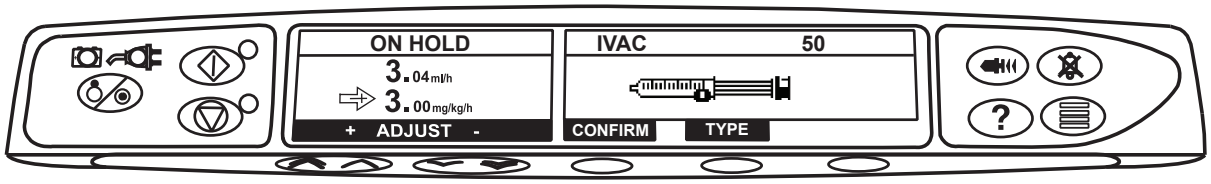
4. Lift the syringe clamp until it locks against the syringe barrel.



5. Squeeze the finger grips on the plunger holder and slide the mechanism to the left until it reaches the plunger end.
6. Release the finger grips. Ensure that the plunger grippers are securing the plunger in place and the finger grip returns to its original position.



7. Ensure that the syringe type and size match those displayed on the pump then press **CONFIRM**. If required, the make of syringe can be changed by pressing the **TYPE** softkey.



Note: If the **PURGE SYRINGE** option has been enabled then the prompt to purge screen is displayed and the extension set can be purged as required, however ensure that the extension set is not connected to the patient during this process.

CareFusion recommends to limit the number of configured syringe types and sizes available for selection on the pump.

Secure the extension set using the extension set hook at the rear of the pump. This provides protection against accidental dislodging of the syringe from the pump.

Ensure that both plunger grippers are fully locked onto the plunger flange and the upper finger grip has returned to its original position.

There are no Volume To Be Infused (VTBI) features in the Alaris® TIVA Syringe Pump during either maintenance or no drug mode. Thus infusion will continue until manual intervention or end of syringe.

Exercise care when entering or adjusting any settings, to ensure that the data and units entered are correct.

Starting the Pump - TIVA Mode

The sequence of operation in TIVA mode is INDUCTION*, PAUSE* and MAINTENANCE. The active mode of this pump is displayed in large characters on the upper left side of the display.

***These modes are optional and can be enabled in the drug setup dialog.**

Configuration allows the user to define drug names, and typical defaults for the information entered in the start sequence below. If there have been no drugs configured these steps will not appear and the pump will operate in normal mode. See "Starting the Pump - NORMAL Mode".

1. Connect the pump to an AC power supply using the AC power cable. Press the ⏻ button.

2. NEW DRUG - If you wish to reset the drug information press the **YES** softkey. If you want to use the previous drug information press the **NO** softkey. Go to step 4.

The start-up drug configuration is:

3. SELECT DRUG - Select a drug from the list displayed. If there are no drugs programmed refer to the configured options to set up the drug protocols.

4. WEIGHT (if required for dosing) - Enter the patient weight using the ⏫⏬ keys. Press the **OK** softkey to enter.

5. Press **OK** softkey to confirm the induction and maintenance rates are set up correctly. Go to step 12. Load syringe, or press **MODIFY** to change.

6. WEIGHT (if required for dosing) - Enter the patient weight using the ⏫⏬ keys. Press the **OK** softkey to enter.

7. CONC - Enter the drug concentration, for example in mg/ml between the limits set in the drug protocol. Press the **OK** softkey to enter.

   If the drug default concentration, minimum concentration and the maximum concentration are equal, this step is bypassed.

8. INDUCTION - Using the ⏫⏬ keys, enter the induction dose amount per kg (if required for dosing) of patient weight. Press the **OK** softkey to enter. The Induction feature may be disabled. Refer to Drug Set-Up to disable/enable the Induction feature.

9. TIME - Enter the induction time in seconds over which the induction dose will be delivered. Press the **OK** softkey to enter.

10. MAINTENANCE - Set the maintenance dose rate in the drug protocol units. Press the **OK** softkey to enter.

11. Press OK softkey to confirm the induction and maintenance rates are set up correctly. Load syringe, or press **MODIFY** to change.

12. Load the syringe according to the 'Loading a Syringe' section.

13. CONFIRM SYRINGE - Check that the syringe type and size being used matches the display. If required, the type of syringe can be changed by pressing the **TYPE** button. Press **CONFIRM** when the correct type and size are shown. Purge extension set if necessary.

If the PURGE SYRINGE option has been enabled then the prompt to purge screen is displayed and the set can be purged as required.

14. PURGE (If required) - See instructions in 'Purge' section.

15. CONNECT PATIENT - Connect the extension set to the patient access device.

16. START - Press ⏻ to commence operation. INDUCTION will be displayed. The AMBER STOP light will be replaced by the flashing GREEN START light to indicate that the pump is operating.

Starting the Pump - NORMAL Mode

When a drug is selected the pump enters TIVA Mode - see Starting the Pump - TIVA Mode.

1. Connect the pump to an AC power supply using the AC power cable. Press the ⏻ button.

2. NEW DRUG - To reset the drug information press the **YES** softkey. If you want to use the previous drug information press the **NO** softkey, continue in TIVA mode as above.

3. Select the **NO DRUG** option from the list displayed.

4. Load the syringe according to the 'Loading a Syringe' section.

5. CONFIRM SYRINGE - Check that the syringe type and size being used matches the display. If required, the type of syringe can be changed by pressing the **TYPE** softkey. Press **CONFIRM** when the correct type and size are shown. Purge extension set if necessary.

If the PURGE SYRINGE option has been enabled then the prompt to purge screen is displayed and the set can be purged as required.

6. SET INFUSION RATE - Set the desired infusion rate in ml/h using the ⏶⏷ keys.

7. PURGE (If required) - See instructions in 'Purge' section.

8. CONNECT PATIENT - Connect the extension set to the patient access device.

9. START - Press the ⏻ button to commence operation. INFUSING will be displayed. The AMBER STOP light will be replaced by the flashing GREEN START light to indicate that the pump is operating.

During the pause and maintenance modes the bolus function is enabled. During hold mode the bolus function is disabled.

Purge

The purge feature is available before the infusion has been started and when the syringe is changed, the syringe must be reconfirmed to activate the purge feature. No alarms are disabled during the operation of the purge feature.

The button allows the delivery of a limited volume of fluid in order to purge the extension set prior to being connected to a patient or after changing a syringe.

1. Press the button when the pump is not infusing. Ensure that the extension set is not connected to the patient.
2. Press and hold the **PURGE** softkey until fluid flows and the purging of the IV infusion set is complete. The volume used during purging will be displayed, but it is not added to the volume infused.
3. When purging is complete release the **PURGE** softkey. Press the **QUIT** softkey to exit back to the main display.

During PURGE the pressure limit alarms are temporarily increased to their maximum level.

Bolus Infusion

The hands free bolus will be cancelled following any interruption in delivery, even if the bolus delivery is incomplete.During BOLUS the pressure limit alarm is temporarily increased to the maximum level.

BOLUS Infusion

The Bolus feature is enabled in Drug Set Up, refer to 'Drug Set Up' section. It is not possible to deliver a bolus during an induction or if bolus is disabled.

To use this feature ensure that the hands free bolus option is disabled. Refer to the 'Drug Set Up' section.

1. During the maintenance phase infusion press the button once. This displays the bolus screen.
2. The bolus delivery rate can be adjusted using the **RATE** softkey.
3. To deliver the bolus, press the **BOLUS** softkey. The pump will display the volume being delivered.
4. When the desired bolus has been delivered, release the **BOLUS** softkey. The bolus volume will be added to the total volume infused. To exit the bolus feature press the **QUIT** softkey.

BOLUS Infusion - Hands Free

During induction it is not possible to deliver a bolus.

This option is enabled/disabled within the drug set-up.

1. During maintenance phase infusion press the button. This will display the bolus screen.
2. Use the to set the bolus dose required. If necessary press the **RATE** softkey to select the bolus delivery rate.
3. Press the **BOLUS** softkey once to begin the delivery of the bolus dose. The display will revert to the main display, showing the bolus being delivered, counting down on the review section of the screen. On completion of the bolus the pump will automatically revert to the maintenance rate.
   The pump will display:

BOLUS
nn.n mg
nn.n ml

4 To exit the bolus feature press the **QUIT** softkey.
5. To terminate a bolus being delivered either press the button and restart the infusion, or press the button and press the **STOP** softkey. This will stop the bolus and continue infusing at the maintenance rate.

Basic Features (Continued)

Pressure Level

1. To check and adjust the pressure level press the ≣ button. A bar graph will be displayed showing the pressure alarm level and the current pressure level.
2. Press the ⏶⏷ keys to increase or decrease the alarm level. The new level will be indicated on the display.
3. Press **OK** to exit the screen.

The interpretation of pressure readings and occlusion alarms are the responsibility of the clinician depending on the specific application.

During a bolus or induction phase the pressure level is set to maximum. The level remains at maximum for 10 seconds after the end of the phase.

Rate Titration

*If Rate Titration is **enabled** the rate can be adjusted **while infusing**:*

1. Select the new rate using the ⏶⏷ keys.
   The message < START TO CONFIRM > will flash on screen and pump continues to infuse at the original rate.
2. Press the ⏻ button to confirm the new infusion rate and start infusing at the new rate.

*If Rate Titration is **disabled** the rate can only be adjusted **whilst on hold:***

1. Press the ⏻ button to put the pump on hold.
2. Select the new rate using the ⏶⏷ keys.
3. Press the ⏻ button to start infusing at the new rate.

Clear Volume

This option enables the volume infused to be cleared.

1. Press the **VOLUME** softkey to display the **CLEAR VOLUME** option.
2. Press the **YES** softkey to clear the volume. Press the **NO** softkey to retain the volume.

Selecting YES resets the volume infused in the 24H LOG option.

Clear Induction (TIVA Mode only)

1. To clear the induction, press the ⏻ button.
2. The **CLEAR INDUCTION** prompt is shown.
   - To clear the induction press the **YES** softkey.
   - Answering **NO** to the **CLEAR INDUCTION** prompt will leave the pump in the **ON HOLD** state; the induction can continue by pressing the ⏻ button.

? Set by Doserate / Set by ml/h (TIVA Mode only)

To set doserate or flowrate in precise increments it may be necessary to switch between the rate adjust options **SET BY DOSERATE** and **SET BY ml/h**. An arrow to the left of the rate display shows the rate changed when the ⏶⏷ keys are used to increase/decrease the infusion rate.

To set a doserate precisely the arrow must be pointing to the doserate (mg/kg/h); the flowrate will be calculated from the doserate.

To precisely set a flowrate the arrow must be pointing to flowrate (ml/h); the doserate will be calculated from the flowrate.

Selecting the Set By ml/h Option

1. Whilst the pump is infusing, press the ? button to access the options menu.
2. Select the **SET BY ml/h** option using the ⏶⏷ keys and press the **OK** softkey indicated on the screen. This will select the set by flowrate option, the arrow on the display will automatically select the flowrate, the flowrate can be adjusted if necessary.

Selecting the Set By Doserate Option

1. Whilst the pump is infusing, press the ? button to access the options menu.
2. Select the **SET BY DOSERATE** option using the ⏶⏷ keys and press the **OK** softkey indicated on the screen. This will select the set by doserate option, the arrow on the display will automatically select the doserate, the doserate can be adjusted if necessary.

? Repeat Operation

When activating REPEAT OPERATION the protocol used for the preceeding operation will be used. This includes any changes made to the concentration, induction dose rate, induction time and maintenance dose rate prior to confirmation.

This option will only appear in the options menu when the infusion has been stopped.

1. Press the ⑦ button to access the options menu.
2. Select the **REPEAT OPERATION** option using the ⏶⏷ keys.
3. Press the **OK** softkey indicated on the screen.

This will revert the pump to the initial programming **WEIGHT** step (if the drug protocol is weight dependant), without powering down the pump.

? End of Operation

This option will only appear in the options menu when the infusion has been stopped.

1. Press the ⑦ button to access the options menu.
2. Select the **END OF OPERATION** option using the ⏶⏷ keys.
3. Press the **OK** softkey indicated on the screen. The pump will display the **NEW DRUG** prompt, and will not be powered down. If you wish to reset the information press the **YES** softkey. If you wish to use the previous information press **NO**.

? 24 Hour Log

This option allows the 24 hour log of volume infused to be reviewed.

1. Press the ⑦ button to access the options menu.
2. Select the **24H LOG** option using the ⏶⏷ keys and press the **OK** softkey.

The display shows the hourly volume infused. The volume infused shown in brackets is the total volume infused since the volume was last cleared. See example below:

07:48 - 08:00 4.34ml (4.34ml)
08:00 - 09:00 2.10ml (6.44ml)
09:00 - 10:00 2.10ml (8.54ml)
VOLUME CLEARED

3. Press the **QUIT** softkey to exit the log.

? Event Log

This option allows the event log to be reviewed. It can be enabled/disabled.

1. Press the ⑦ button to access the options menu.
2. Select the **EVENT LOG** option using the ⏶⏷ keys and press the **OK** softkey.
3. Scroll through the log using the ⏶⏷ keys. Press the **QUIT** softkey to exit the log.

? Dosing Summary (TIVA Mode only)

1. Press the ⑦ button to access the options menu.
2. Select the **DOSING SUMMARY** option using the ⏶⏷ keys and press the **OK** softkey.
3. Press the **QUIT** softkey to exit the menu.

Alarms and Warnings

Alarms are indicated by a combination of an audible alarm, flashing alarm indicator and a descriptive message in the display.

1. First press the ⊗ button to silence the alarm for a maximum of 2 minutes*, then check the display for an alarm message. Press **CANCEL** to cancel the alarm message.
2. If the infusion has stopped, rectify the cause of the alarm then press the ⏻ button to resume the infusion.

If the pump initiates a safety processor alarm condition (an audible high pitched continuous shrill accompanied with a red alarm indicator) and there is no error message displayed on the pump, remove the pump from service for examination by a qualified service engineer.

Display	*Description and Troubleshooting Guide*
DRIVE DISENGAGED	The drive system has been disengaged during operation. Check the finger grips and the position of the syringe.
OCCLUSION	Excessive pressure measured at the syringe plunger exceeding the alarm limit. Identify and remove the cause of the blockage in the drive, syringe, or administration system before restarting the infusion.
CHECK SYRINGE	Incorrect size of syringe has been fitted, the syringe has not been positioned correctly or has been disturbed during operation. Check the syringe location and the position.
BATTERY LOW	Battery charge low with 30 minutes operation remaining. Battery indicator will flash and after 30 minutes a continuous audible alarm will indicate that the battery is exhausted. Reconnect to the AC power supply to continue operation and charge the internal battery.
BATTERY EMPTY	The internal battery is exhausted. Connect the pump to the AC power supply.
NEAR END OF INFUSION	The pump is nearing the end of the infusion.This value can be configured.
END OF INFUSION	The pump has reached the end of the infusion. A pre-set volume will remain in the syringe to minimise the risk of the infusion of air bubbles into the set. This value can be configured.
TITRATION NOT CONFIRMED	The infusion rate has been changed, but has not been confirmed and 2 minutes* has expired without any operation. Press the ⊗ button to silence the alarm, then press the **CANCEL** softkey to clear this message and silence the alarm. Check infusion rate and confirm by pressing the ⏻ button or press the ▽ button to revert to the previous rate. Press the ⏻ button to start infusion. (This alarm only occurs if rate titration is enabled).
AC POWER FAIL	AC Power has been disconnected and the pump is operating on battery power, if this occurs when the pump is infusing the message "**INFUSION CONTINUES**" will be displayed. Reconnect AC power supply or press the ⊗ button to silence the alarm and continue with battery operation. The alarm will automatically cancel if the AC power supply is reconnected.
Error Code and Message	The alarm system has detected an internal malfunction. Note the malfunction code. Remove pump from service for examination by a qualified service engineer.
ATTENTION *(with "3 Beeps")*	Three beeps will sound if the pump has been left ON for more than 2 minutes* (referred to as **CALLBACK** in the log) without starting the operation. Press the ⊗ button to silence the alarm for a further 2 minutes*. Alternatively press and hold down the ⊗ button and wait for 3 beeps in succession, this will put the warning alarm on standby for 60 minutes.

Alarm Indicator Colour	*Alarms indicated*
AMBER	AC POWER FAIL; NEAR END OF INFUSION; ATTENTION; TITRATION NOT CONFIRMED; BATTERY LOW.
RED	All others.

*Configurable option.

Configured Options

This menu comprises a list of options which are configurable by the user.

1. Turn the pump **OFF**.
2. Whilst holding down the ⏻ button turn the pump **ON**.
3. The main display will show **000**. Enter the access code for Configured Options using the ⏶⏷ keys, pressing **NEXT** to move through the digits. A full list of access codes can be found in the Technical Service Manual.
4. When the complete code shows on screen, press **OK** to enter. The Configured Options menu will be displayed.

General Options

1. Select **GENERAL OPTIONS** from the menu using the ⏶⏷ keys and press the **OK** softkey.
2. Select the option you wish to enable/disable or adjust and press the **MODIFY** softkey.
3. When all the desired modifications have been carried out press the **QUIT** softkey.
4. Either select the next configuration option from the menu or turn the pump **OFF**, returning it to operation as required.

NURSE CALL FITTED	Enables Nurse Call (hardware option).
NURSE CALL INVERT	When enabled, the nurse call output is inverted.
RS232 SELECTED	Sets the pump's communications to use RS232 (hardware option).
NEOI WARNING	Sets the Near End Of Infusion warning time, as time left to End Of Infusion.
EOI POINT	Sets the End Of Infusion point.
KVO AT EOI	When enabled the pump will switch to running at the KVO rate when EOI is reached.
KVO RATE	Sets the Keep Vein Open (KVO) rate at which the pump will operate if KVO at EOI is enabled.
BACK OFF	When enabled the motor will reverse to relieve line pressure when an occlusion occurs.
AC FAIL	When enabled the AC Power Failure Alarm will sound if the AC power is disconnected.
PRESSURE DISPLAY	Enables / disables the Pressure Icon on the main display.
PRESSURE DEFAULT	Sets the default occlusion alarm level.
WEIGHT	Sets up default patient weight, for TIVA mode only.
PURGE RATE	Sets the purge rate.
PURGE VOLUME LIMIT	Sets the maximum permissible purge volume.
PURGE SYRINGE	Prompt to purge syringe after confirmation.
HANDS FREE BOLUS	Enables / disables the hands free bolus feature.
DEFAULT BOLUS VOL	Sets the default hands free bolus volume, for no drug mode only.
DEFAULT BOLUS RATE	Sets the default bolus rate.
MANUAL BOLUS	Volume infused will be increased if plunger is manually moved in and syringe remains confirmed.
CALL BACK TIME	Adjusts the time for the pump to sound the call back alarm.
EVENT LOG DISPLAY	Enables / disables the event log.
BATTERY ICON	Enables / disables the Battery Icon on the main display.
AUDIO VOLUME	Sets the alarm volume of the pump at high, medium or low.
AUTO NIGHT MODE	Backlight dims between hours 21:00 and 06:00.

Configured Options (Continued)

Clock Set

1. Select **CLOCK SET** from the Configured Options menu using the ⏫🔼🔽⏬ keys and press the **OK** softkey.
2. Use the ⏫🔼🔽⏬ keys to adjust the date displayed, pressing the **NEXT** softkey to access the next field.
3. When the correct time and date are displayed press the **OK** softkey to return to the Configured Options menu.

Hospital Name

This option allows the user to programme in the name of the hospital, ward or department. This will appear during the power-up display sequence.

1. Select **HOSPITAL NAME** from the Configured Options menu using the ⏫🔼🔽⏬ keys and press the **OK** softkey.
2. Use the keys to adjust the character displayed, pressing **NEXT** to access the next position.
3. When the correct name is displayed press **OK** to return to the Configured Options menu.

Enable Syringes

This option is used to pre-configure the type and size of syringe permitted for use on the pump. Select all possible syringes which may be used and disable any that should not be used.

1. Select **ENABLE SYRINGES** from the Configured Options menu using the ⏫🔼🔽⏬ keys and press the **OK** softkey.
2. Use the ⏫🔼🔽⏬ keys to scroll through the list of syringes, pressing **MODIFY** to enable/disable a syringe brand and individual models within the brand.
3. When all modifications are complete press **OK** to return to the Configured Options menu.

Language

This option is used to set the language of messages shown on the pump display.

1. Select **LANGUAGE** from the Configured Options menu using the ⏫🔼🔽⏬ keys and press the **OK** softkey.
2. Use the ⏫🔼🔽⏬ keys to select the language.
3. When the desired language has been selected press **SELECT** softkey to return to the Configured Options menu.

Contrast

This option is used to set the contrast on the pump display.

1. Select **CONTRAST** from the Configured Options menu using the ⏫🔼🔽⏬ keys and press the **OK** softkey.
2. Use the ⏫🔼🔽⏬ keys to select a contrast ratio value. The contrast of the display will change when scrolling through the numbers.
3. When the desired value has been reached press the **OK** softkey to return to the Configured Options menu.

Alaris® TIVA Syringe Pump Configured Options Record

General Options

Enter the pump-specific information for your records on a copy of this page.

Option	Default		Range	Setting
Software Version	1.6.2 & 2.1.0	1.9.x & 2.3.x and above		
NURSE CALL FITTED	Disabled	Disabled	Enabled/Disabled	
NURSE CALL INVERT	Disabled	Disabled	Enabled/Disabled	
RS232 SELECTED	Disabled	Disabled	Enabled/Disabled	
NEOI WARNING	1min	5mins	1min - 15mins	
EOI POINT	1.0%	1.0%	0.1% - 5% of syringe volume	
KVO AT EOI	Enabled	Enabled	Enabled/Disabled	
KVO RATE	1.0ml/h	1.0ml/h	0.1ml/h - 2.5ml/h	
BACK OFF	Disabled	Enabled	Enabled/Disabled	
AC FAIL	Enabled	Enabled	Enabled/Disabled	
PRESSURE DISPLAY	Disabled	Enabled	Enabled/Disabled	
PRESSURE DEFAULT	L-5	L-3	L0 - 10(50mmHg -1000mmHg)	
WEIGHT	70.0Kg	70.0Kg	0.01Kg - 250Kg	
PURGE RATE	200ml/h	200ml/h	100ml/h - 500ml/h	
PURGE VOLUME LIMIT	2.0ml	2.0ml	0.5ml - 5.0ml	
PURGE SYRINGE	Enabled	Disabled	Enabled/Disabled	
HANDS FREE BOLUS	Enabled	Enabled	Enabled/Disabled	
DEFAULT BOLUS VOL	5.0ml	5.0ml	0.1ml - 100ml	
DEFAULT BOLUS RATE	1200ml/h	1200ml/h	150ml/h - 1200ml/h	
MANUAL BOLUS		Disabled	Enabled/Disabled	
CALLBACK TIME		2.0mins	0.1mins - 15.0mins	
EVENT LOG DISPLAY	Disabled	Enabled	Enabled/Disabled	
BATTERY ICON		Enabled	Enabled/Disabled	
AUDIO VOLUME	Medium	Medium	Low, Medium, High	
AUTO NIGHT MODE	Enabled	Enabled	Enabled/Disabled	

Syringes Enabled

Make	Size(s)	Make	Size(s)

Hospital Name	Serial No.	Software Version
Approved by	Configured by	
Date	Date	

Configured Options (Continued)

Drug Set-up

1. Select the **DRUG LIBRARY** option using the ⏶⏷ keys and press the **OK** softkey indicated on the screen.
2. To add a **DRUG NAME** press **NEW** softkey indicated on the screen and modify as indicated.
3. Select the required drug and press the **MODIFY** softkey.
4. To use a drug it must be enabled.
5. To change the drug name press the **EDIT** softkey indicated using the ⏶⏷ keys to toggle through the alphabet. To select a letter press the **NEXT** softkey. On completion press the **OK** softkey indicated on the screen.
6. Select the **CONCENTRATION UNITS** Units using the ⏶⏷ keys, press the **OK** softkey to select the concentration units.
7. Select the **MINIMUM CONCENTRATION** of the drug selected. Use the ⏶⏷ keys to increase/decrease the minimum concentration shown on the screen. When the minimum concentration has been selected press the **OK** softkey.
8. Select the **DEFAULT CONCENTRATION** of the drug selected, use the ⏶⏷ keys to increase/decrease the default concentration shown on the screen. When the default concentration has been selected press the **OK** softkey.
9. Select the **MAXIMUM CONCENTRATION** of the drug selected. Use the ⏶⏷ keys to increase/decrease the maximum concentration shown on the screen. When the maximum concentration has been selected press the **OK** softkey.

If the default concentration, the minimum concentration and the maximum concentration are equal the start-up sequence will bypass the concentration request.

10. Select the **DOSE RATE UNITS** required for maintenance doses, use the ⏶⏷ keys to select the dose units required. When the dose units required have been selected press the **OK** softkey.
11. Select the **INDUCTION DOSE** (in dose units) required, use the ⏶⏷ keys to increase / decrease the induction displayed. When the induction has been selected press the **OK** softkey.

    If the setting is less than 0.01 then it turns the Induction setting off. It will disable the Induction Set-Up in TIVA mode.
12. Select the **INDUCTION TIME** required, use the ⏶⏷ keys to increase/decrease the time over which the induction is to take place. When the time has been selected press the **OK** softkey.
13. PAUSE AFTER INDUCTION. Select **ENABLED** and the infusion will stop after the induction period awaiting the operator pressing the ⏻ button to continue at the chosen maintenance rate.

    Select **DISABLED** and the infusion will continue to give the chosen maintenance rate after induction.
14. Select the **MAINTENANCE RATE** required, use the ⏶⏷ keys to increase/decrease the maintenance rate. When the rate has been selected press the **OK** softkey.
15. Select the **BOLUS DOSE** (selected in dose units) required. Use the ⏶⏷ keys to increase / decrease the bolus dose. When the dose has been selected press the **OK** softkey.

    If the **OFF** softkey is pressed then it turns the Bolus setting off. It will disable the Bolus feature in TIVA mode.
16. Select the default **BOLUS RATE** required, use the ⏶⏷ keys, to select from 150ml/h, 300ml/h, 600ml/h, 900ml/h or 1200ml/h.

    When the rate has been selected press the **OK** softkey.
17. To select **HANDS FREE BOLUS** use the ⏶⏷ keys to choose **ENABLED/DISABLED**. Press the **OK** softkey to confirm selection.
18. REVIEW THE DRUG SETUP DATA, press the **OK** softkey to confirm the data displayed. This will return the pump to the drug setup menu.

Alaris® TIVA Syringe Pump Drug Protocol Setup

Hospital _____ **Ward/Unit** _____

No. (1-50*)	Drug Name (12 Chars max*)	Concentration				Dose Rate Units	Induction (dose) (–/Kg)	Time (sec)	Pause after Induction (✓/×)	Maintenance	Bolus		
		Units (–/ml)	Min	Default	Max						Dose (–/Kg)	Rate (ml/h)	Hands Free (✓/×)

Serial Number _____ **Software Version** _____

Approved by _____ **Configured by** _____

Date _____ **Date** _____

* - 100 drug names with a maximum of 17 characters are available for V2.3.x software and above.

Specifications

Infusion Specifications -

Maximum infusion rate can be set as part of the configuration.

0.1ml/h - 150ml/h	5ml syringes
0.1ml/h - 300ml/h	10ml syringes
0.1ml/h - 600ml/h	20ml syringes
0.1ml/h - 900ml/h	30ml syringes
0.1ml/h - 1200ml/h	50ml syringes

The Volume Infused range is 0.0ml - 9990ml.

Bolus Specifications -

Selected maximum rates are shown below

150ml/h	5ml syringes
300ml/h	10ml syringes
600ml/h	20ml syringes
900ml/h	30ml syringes
1200ml/h	50ml syringes

The default bolus volume can be set as part of the configuration.

Minimum: 0.1ml;

Maximum 100.0ml

Increments of 0.1ml; default 5.0ml

During BOLUS the pressure limit alarms are temporarily increased to their maximum level.

Critical Volume -

The bolus which can occur in the event of a single internal fault condition with a 50 ml syringe is :

Maximum Overinfusion - 0.5ml

Purge Specifications -

The purge rate is limited to the maximum rate for the syringe and can be set as part of the configuration.

100ml/h - 500ml/h.

The purge volume range is 0.5ml - 5ml.

During PURGE the pressure limit alarms are temporarily increased to their maximum level.

Keep Vein Open (KVO) Rate -

0.1 ml/h - 2.5ml/h.

End Of Syringe Rate -

Stop, KVO (0.1ml/h to 2.5ml/h), or set rate if lower than KVO.

Near End Of Infusion Alarm -

1min - 15min to end of infusion, or 10% of syringe volume, whichever is smaller.

End Of Infusion (EOI) Alarm -

0.1% - 5% of syringe volume

Electrical Classification -

Class I product. Continuous Mode Operation, Transportable

Maximum Pumping Pressure Limit -

Highest alarm level 1000mmHg (nominal at L-10)

Occlusion Accuracy (% of full scale)* -

	Pressure mmHg			
	L-0 approx. 50 mmHg	L-3 approx. 300 mmHg	L-5 approx. 500 mmHg	L-10 approx. 1000 mmHg
Temp. 23°C	±18%	±21%	±23%	±28%

* - Using most common 50ml syringes under normal conditions (95% confidence / 95% of pumps).

Battery Specifications -

Rechargeable sealed NiMH. Automatically charges when the pump is connected to AC power.

Mean Time To Battery Empty from fully charged @ 5ml/h & 20°C under normal conditions is 6 hours*

*95% lower confidence interval of 5 hours 50 minutes

Charging takes 2½ hours from discharge to 90% charge.

Memory Retention -

The electronic memory of the pump will be retained for more than 6 months when not powered up.

System Accuracy -

Volumetric Mean +/- 2% (nominal).

Derating -

Temperature +/- 0.5% (5 - 40°C)

High Rates +/-2.0% (rates > syringe volume/h eg. >50ml/h in a 50ml syringe.)

Important: System accuracy is +/-2% typical by volume as measured using the trumpet curve test method defined in IEC/EN60601-2-24 at rates of 1.0ml/h (23°C) and above when the pump is used with the recommended syringes. Caution: Infusion volume accuracy may be compromised at rates below 1.0ml/h. Differences in factors such as size and plunger force in compatible syringes can cause variations in accuracy and trumpet curves. See also trumpet curves section in this manual.

Fuse Type -

2 x T 1.25A, slow blowing.

AC Power Supply -

115 - 230VAC, 50 - 60Hz, 20VA (nominal).

Dimensions -

310 mm (w) x 121 mm (h) x 200 mm (d). Weight: 2.7 kg (excluding power cable).

Alarm Conditions -

Drive Disengaged	Occlusion
Check Syringe	Battery Low / Battery Empty
Near End Of Infusion	End of Infusion
AC Power Fail	Internal Malfunction
Attention (Nurse Callback)	Titration not confirmed

Environmental Specifications -

Operating Temperature	**+5°C - +40°C**
Operating Relative Humidity	**20% - 90%**
Operating Atmospheric Pressure	**700hPa - 1060hPa**
Transport & Storage Temperature	**-30°C - +50°C**
Transport & Storage Relative Humidity	**10% - 95%**
Transport & Storage Atmospheric Pressure	**500hPa - 1060hPa**

Electrical/Mechanical Safety -

Complies with IEC/EN60601-1 and IEC/EN60601-2-24.

Protection against fluid ingress -

IPX1 - Protected against vertically falling drops of water.

EMC -

Complies with IEC/EN60601-1-2 and IEC/EN60601-2-24.

Conversion Factor

Dosing Conversion:

1.0 µg = 1000 ng

1.0 mg/h = 24.0 mg/24 h

1.0 mg/min = 60.0 mg/h

1.0 mg = 1000 µg

Volume / Unit Time = Dose Rate / Concentration

1.0 ml/h = 1.0 mg/h / 1.0 mg/ml

The formula is:

Volume/Rate =

$$\frac{(.....\mu g/kg/min) \times (.....kg) \times (60\ min/h)}{\text{conc. in mg/ml} \times 1000\ \mu g/mg} = \frac{\mu g/h}{\mu g/ml} = ml/h$$

Drug Units Available:

ml/h, ng/min, ng/kg/min

µg/min, µg/kg/min, µg/h, µg/kg/h, µg/24h, µg/kg/24h

mg/min, mg/kg/min, mg/h, mg/kg/h, mg/24h, mg/kg/24h,

g/h, g/24h, U/min, U/kg/min, U/h, U/kg/h, U/24h, U/kg/24h,

kU/24h, mmol/h

Compatible Syringes

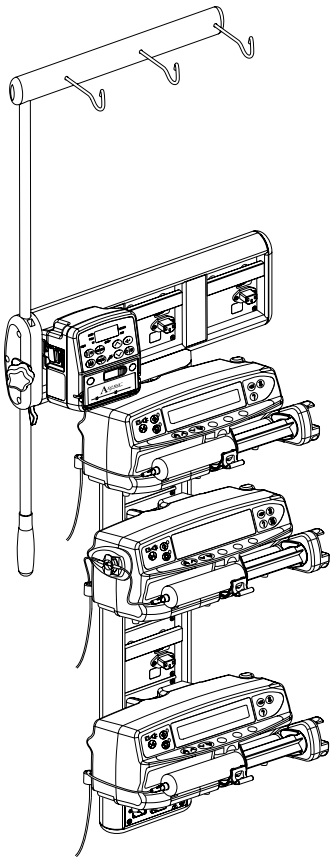
The pump is calibrated and labelled for use with single-use disposable Luer lock syringes. Only use the size and type of syringe specified on the pump display. The full list of permitted syringe models is dependent on the software version of the pump.

	5ml	10ml	20ml	30ml	50ml
IVAC®					✓
AstraZeneca					✓
B Braun Omnifix	✓	✓	✓	✓	✓
B Braun Perfusor			✓		✓
BD Perfusor					✓
BD Plastipak	✓	✓	✓	✓	✓
BD Precise			✓		✓
Codan		✓	✓	✓	✓
Codan Perfusion					✓
Fresenius Injectomat		✓			✓
Monoject**	✓	✓	✓	✓	✓
Nipro	✓		✓	✓	✓
Pentaferte	✓	✓	✓		✓
Rapiject*					✓
Terumo	✓	✓	✓	✓	✓

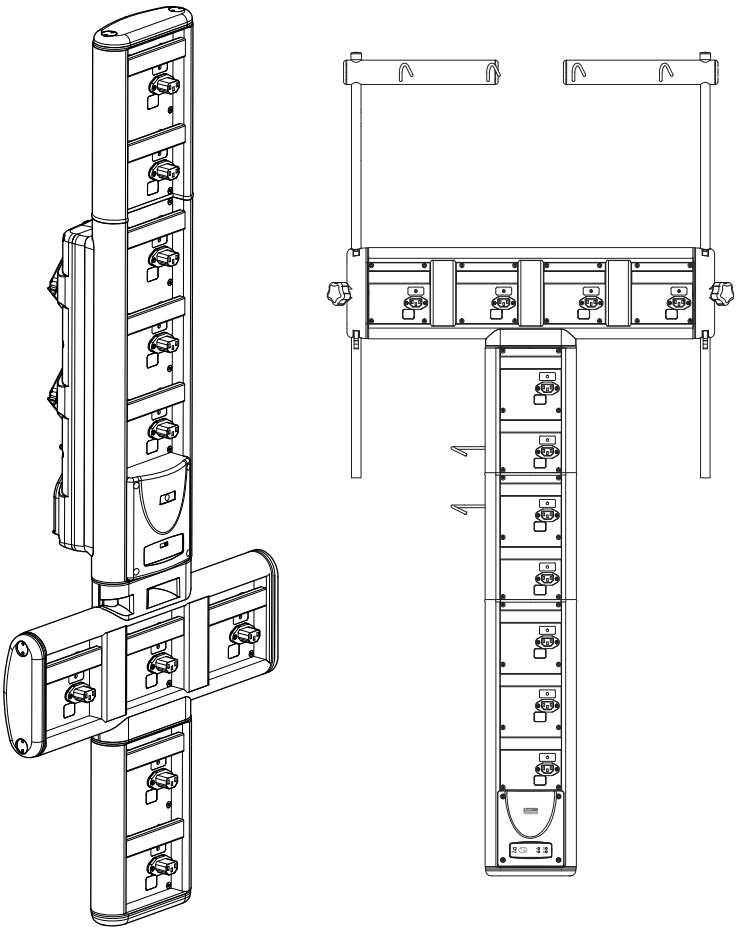
* - The Rapiject 50ml syringe is a specialised syringe with a large diameter barrel. To provide protection against accidental dislodging always ensure the infusion line is secured using the infusion set hook - see Loading a Syringe section.
** - ⇶YCO / Healthcare KENDALL - MONOJECT.

Associated Products

The Alaris® DS Docking Station



The Alaris® Gateway Workstation



Compatible Extension Sets

The pump uses standard, single-use, disposable extension sets and syringes with Luer lock connectors. The user is responsible for verifying the suitability of a product used, if it is not recommended by Cardinal Health.

For availability please contact your local CareFusion representative because new sets are continuously being developed for our customers.

Standard Sets

G40015 Standard PVC Syringe Extension Set (150 cm).
Priming Volume: 2.6ml

G40020B Standard PVC Syringe Extension Set (200 cm).
Priming Volume: 1.5ml

G402EP Extension set, Luer lock connectors. Kink resistant DEHP free PVC yellow striped tubing. Bore 1mm. Length 200cm.
Priming volume 1.6ml.

Light Protected Sets

G40215 Amber PVC Syringe Extension Set (150 cm).
Priming Volume: 1.2ml

G40320 White PVC Syringe Extension Set (200 cm).
Priming Volume: 3.6ml

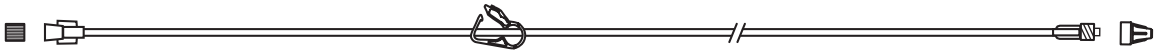
04105010509 Polyethylene Syringe Extension Set (100 cm).
Priming Volume: 1ml

Low Sorbing Sets

G40615 Polyethylene Syringe Extension Set (150 cm).
Priming Volume: 1.5ml

G40620 Polyethylene Syringe Extension Set (200 cm).
Priming Volume: 1.6ml

G40720 Polyethylene Lined Syringe Extension Set with clamp. (200 cm).
Priming Volume: 1.5ml



It is recommended that extension sets are changed in accordance with the Directions for Use.
Carefully read the Directions For Use supplied with the extension set prior to use.

Please note these drawings are not to scale

Compatible Extension Sets (Continued)

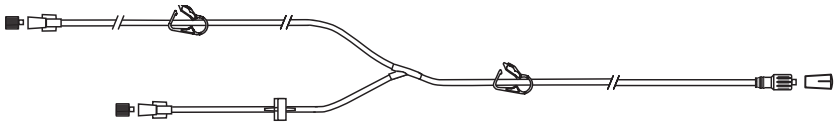
The pump uses standard, single-use, disposable extension sets and syringes with Luer lock connectors. The user is responsible for verifying the suitability of a product used, if it is not recommended by CareFusion.

For availability please contact your local CareFusion representative because new sets are continuously being developed for our customers.

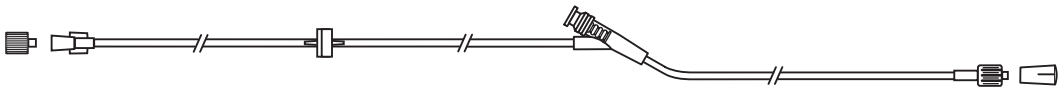
Patient Controlled Analgesia (PCA) Sets

30822 PVC Syringe Extension Set with clamp (152 cm).
Priming Volume: 0.5ml

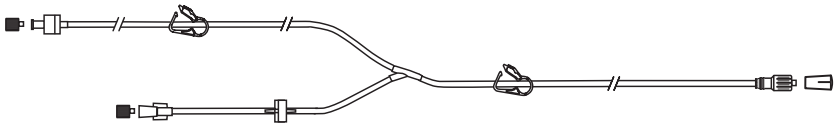
30832 PVC 'Y' Syringe Extension Set with back check valve and 2 clamps (178 cm).
Priming Volume: 1.5ml



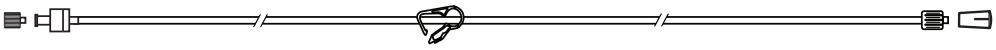
30842E PVC Syringe Extension Set with back check valve, SmartSite® Needle-Free Valve Port and clamp (30 cm).
Priming Volume: 1.4ml



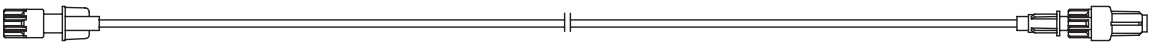
30852 PVC 'Y' Syringe Extension Set with anti-siphon valve, back check valve and 2 clamps (183 cm).
Priming Volume: 1.8ml



30862 PVC Syringe Extension Set with anti-siphon valve and clamp (156 cm).
Priming Volume: 0.6ml



04102215162 PVC Syringe Extension Set with rotating luer. (150 cm).
Priming Volume: 2.9ml



04100010162 PVC Syringe Extension Set (105 cm).
Priming Volume: 7.2ml

It is recommended that extension sets are changed in accordance with the Directions for Use.
Carefully read the Directions For Use supplied with the extension set prior to use.

Please note these drawings are not to scale

Maintenance

Routine Maintenance Procedures

To ensure that this pump remains in good operating condition, it is important to keep it clean and carry out the routine maintenance procedures described below.

Interval	*Routine Maintenance Procedure*
As per Hospital Policy	Thoroughly clean external surfaces of the pump before and after prolonged period of storage.
Each usage	1. Inspect AC power supply plug and cable for damage.
	2. Inspect case, keypad and plunger for damage.
	3. Check Start up self test operation is correct.
Before the transfer of the pump to a new patient and as required	Clean the pump by wiping over with a lint-free cloth lightly dampened with warm water and a standard disinfectant / detergent solution.

If the pump is dropped, damaged, subjected to excessive moisture or high temperature, immediately take it out of service for examination by a qualified service engineer.

All preventative and corrective maintenance and all such activities shall be performed at a compliant work place in accordance with the information supplied. CareFusion will not be responsible should any of these actions be performed outside the instructions or information supplied by CareFusion. For Preventative and Corrective Maintenance instructions please refer to the Technical Service Manual (TSM).

All servicing should only be performed by a qualified service engineer with reference to the TSM.

Please refer to Technical Service Manual for calibration procedures. The units of measurement used in the calibration procedure are standard SI (The International System of Units) units.

Battery Operation

The internal rechargeable battery allows continued operation when the AC power is unavailable, for example during patient transfer or AC power failure. Mean Time To Battery Empty from fully charged @ 5ml/h & 20°C under normal conditions is 6 hours*. From the battery low alarm it will take about 2½ hours to 90% charge when reconnected to the AC power supply, whether the pump is in use or not.

The battery is maintenance free, sealed Nickel Metal Hydride and requires no routine servicing. However, to achieve optimum operation, ensure that the battery is fully recharged after full discharge, before storage, and at regular 3 month intervals during storage.

Charge retention will eventually degrade. Where retention is critical the internal battery should be replaced every 3 years.

It is recommended that only a qualified service engineer replaces the battery. For further information regarding the replacement of batteries refer to the Technical Service Manual.

The battery pack used in this Alaris® Syringe Pump is manufactured by CareFusion and includes a proprietary PCB (printed circuit board) designed specifically for the Alaris® Syringe Pump, and in conjunction with Alaris® Syringe Pump software, controls battery use, charge and temperature. Any use of battery packs that are not manufactured by CareFusion in the Alaris® Syringe Pump is at your sole risk, and CareFusion does not provide any warranty for or endorsement on any battery packs that are not manufactured by CareFusion. CareFusion's product warranty shall not apply in the event the Alaris® Syringe Pump has suffered damage or premature wear, or malfunctions or otherwise operates incorrectly, as a result of use with a battery pack that is not manufactured by CareFusion.

*95% lower confidence interval of 5 hours 50 minutes

Maintenance (continued)

Cleaning and Storage

Before the transfer of the pump to a new patient and periodically during the use, clean the pump by wiping over with a lint-free cloth lightly dampened with warm water and a standard disinfectant / detergent solution.

Recommended cleaners are:

Brand	Concentration
Hibiscrub	20% (v/v)
Virkon	1% (w/v)

Do not use the following disinfectant types:

- Disinfectants which are known to be corrosive to metals must not be used, which include:
    - NaDcc (such as Presept),
    - Hypochlorites (such as Chlorasol),
    - Aldehydes (such as Cidex),
    - Cationic Surfactants (such as Benzalkonium Chloride).
- Use of Iodine (such as Betadine) will cause surface discoloration.
- Concentrated Isopropyl alcohol based cleaners will degrade plastic parts.

The syringe and extension sets are disposable single use items and should be discarded after use according to their manufacturers' instructions.

If the pump is to be stored for an extended period it should be first cleaned and the internal battery fully charged. Store in a clean, dry atmosphere at room temperature and, if available, employ the original packaging for protection.

Once every 3 months during storage, carry out functional tests as described in the Technical Service Manual and ensure that the internal battery is fully charged.

Before cleaning always switch OFF and disconnect from the AC power supply. Never allow liquid to enter the casing and avoid excess fluid build up on the pump. Do not use aggressive cleaning agents as these may damage the exterior surface of the pump. Do not steam autoclave, ethylene oxide sterilise or immerse this pump in any fluid.

Disposal

Information on Disposal for Users of Waste Electrical & Electronic Equipment

This ⌧ symbol on the product and/or accompanying documents means that used electrical and electronic products should not be mixed with household waste.

If you wish to discard electrical and electronic equipment, please contact your CareFusion affiliate office or distributor for further information.

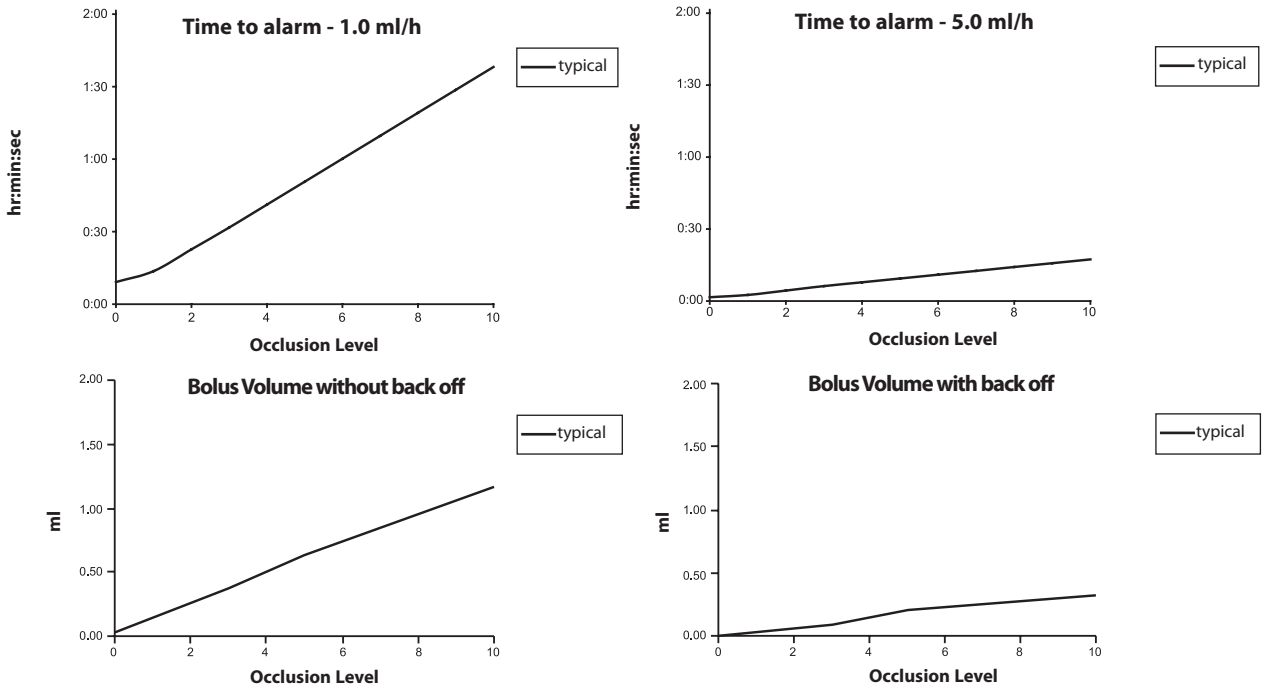
Disposing of this product correctly will help to save valuable resources and prevent any potential negative effects on human health and the environment which could otherwise arise from inappropriate waste handling.

Information on Disposal in Countries outside the European Union

This symbol is only valid in the European Union. The product should be disposed of taking environmental factors into consideration. To ensure no risk or hazard, remove the internal rechargeable battery and the Nickel Metal Hydride battery from the control board and dispose of as outlined by the local country regulations. All other components can be safely disposed of as per local regulations.

Occlusion Pressure Limits

Time to alarm following occlusion is achieved in less than 30 minutes at rates of 1 ml/h and higher by the appropriate selection of occlusion levels.
The following graphs show the typical values for time to alarm and bolus volume that can be expected in the event of an occlusion when the BD Plastipak 50 ml syringe is selected with a G40020B standard extension set.



Tests at low alarm levels may alarm immediately - the force at these levels is commonly less than the friction in the syringe (with no additional fluid pressure). The result is that the pressure relating to the low forces will be less than the nominal quoted occlusion pressure.

Bolus volume following occlusion will be minimised by the back off feature if enabled. The back off will reduce the line pressure by removing the volume stored in the occluded line and deducting this volume from the volume infused.

IrDA, RS232 and Nurse Call Specification

IrDA / RS232 / Nurse Call Feature

The RS232 / Nurse call feature is an optional feature on Alaris® Syringe Pumps. It allows the pump to be monitored remotely and/or controlled via a suitable central monitoring or computer system.

When the pump is started by a command from the serial interface, communication must take place over the serial interface, a communication must take place every 15 seconds or the pump will alarm, display communications failure and stop infusing. This failure protects against failure of the communications, including the removal of the RS232 cable.

The nurse call interface provides a remote backup to the internal audible alarm. It should not be relied upon to replace monitoring of the internal alarm.

Refer to the Technical Service Manual for further information regarding the RS232 interface. Since it is possible to control the syringe pump using the RS232 interface at some distance from the pump and hence remote from the patient, responsibility for the control of the pump is vested in the software run on the computer control system.

The assessment for the suitability of any software used in the clinical environment to control or receive data from the pump lies with the user of the equipment. This software should include detection of the disconnection or other failure of the RS232 cable. The protocol is detailed in the Technical Service Manual and is for general information only.

Any connected analogue and digital components are required to meet IEC/EN60950 for data processing and IEC/EN60601 for medical devices. Anyone connecting additional devices to the signal input or output is a system configurator and responsible for meeting the requirements of the system standard IEC/EN60601-1-1.

IrDA

Baud Rate	38.4 kBaud
Start Bits	1 Start Bit
Data Bits	8 Data Bits
Parity	No Parity
Stop Bits	1 stop bit

RS232 / Nurse Call Connection Data

Nurse call Specification -

Connector	D Type - 9 Pin
TXD/RXD	EIA RS232-C Standard
TXD Output Voltage Range	Minimum: -5V (mark), +5V (space) Typical: -7V (mark), +7V (space) with 3kΩ load to ground
RXD Input Voltage Range	-30V - +30V max.
RXD Input Thresholds	Low: 0.6V minimum / High: 3.0V maximum
RXD Input Resistance	3kΩ minimum
Enable	Active, Low:-7V to -12V Active, High:+7V to +12V, powers up the isolated RS232 circuitry Inactive: Floating/open circuit, allows isolated RS232 circuitry to power down.
Isolation Socket/Pump	1.5kV (dc, or ac peak)
Baud Rate	38.4 kBaud
Start Bits	1 Start Bit
Data Bits	8 Data Bits
Parity	No Parity
Stop Bits	1 stop bit
Nurse Call Relay Contacts	Pins 1, 8 + 9, 30V dc, 1A rating

Typical Connection Data -

1 Nurse call (Relay) Normally Closed (NC C)

2 Transmit Data (TXD) Output

3 Received Data (RXD) Input

4 Power Input (DSR)

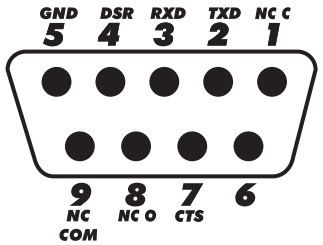
5 Ground (GND)

6 Not used

7 Power Input (CTS)

8 Nurse call (Relay) Normally open (NC O)

9 Nurse call (Relay) Common (NC COM)



Trumpet Curves & Start-up Curves

In this pump, as with all infusion systems, the action of the pumping mechanism and variations in individual syringes cause short-term fluctuations in rate accuracy.

The following curves show typical performance of the system in two ways: 1) the delay in onset of fluid flow when infusion commences (start-up curves), and 2) the accuracy of fluid delivery over various time periods is measured (trumpet curves).

The start-up curves represent continuous flow versus operating time from the start of the infusion. They exhibit the delay in onset of delivery due to mechanical compliance and provide a visual representation of uniformity. Trumpet curves are derived from the second hour of this data. Tests performed per IEC/EN60601-2-24 standard.

Trumpet curves are named for their characteristic shape. They display discrete data averaged over particular time periods or 'observation windows', not continuous data versus operating time. Over long observation windows, short term fluctuations have little effect on accuracy as represented by the flat part of the curve. As the observation window is reduced, short term fluctuations have greater effects as represented by the "mouth" of the trumpet.

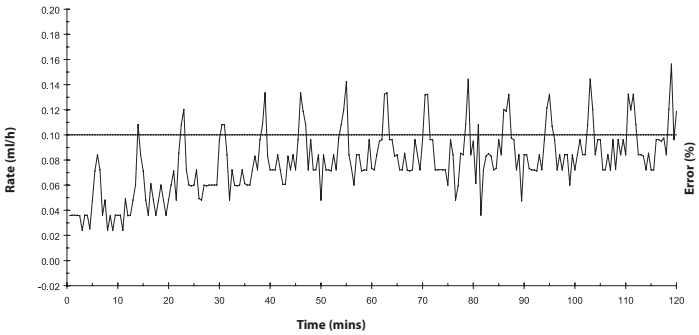
Knowledge of system accuracy over various observation windows may be of interest when certain drugs are being administered. Short term fluctuations in rate accuracy may have clinical impact depending on the half-life of the drug being infused, therefore the clinical effect cannot be determined from the trumpet curves alone.

Start-up and trumpet curves may not be indicative of operation under negative pressure.

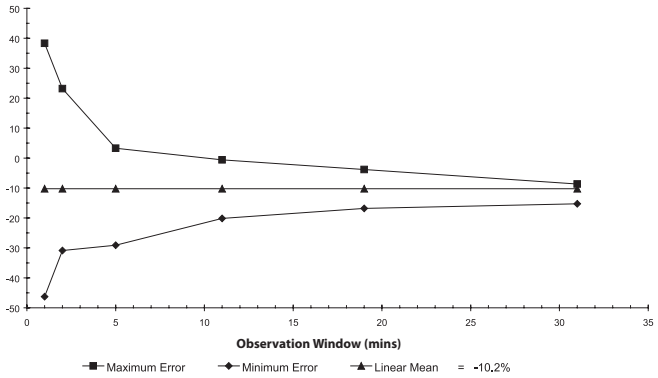
Differences in factors such as size and plunger force in compatible syringes produced by other manufacturers can cause variations in accuracy and trumpet curves as compared to those represented. Additional curves for compatible syringes are available upon written request.

For applications where flow uniformity is a concern, rates of 1.0 ml/h or above are recommended.

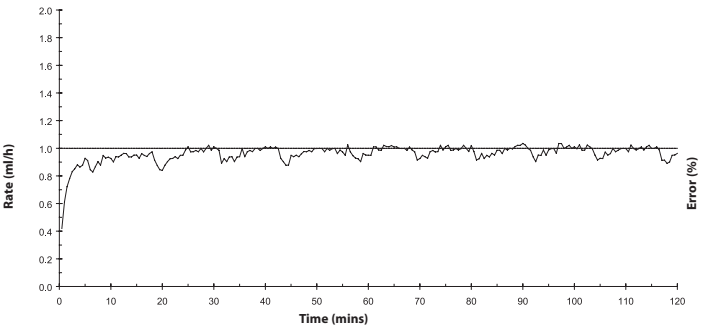
Start-up Trend. BD Plastipak 50ml @ 0.1ml/h



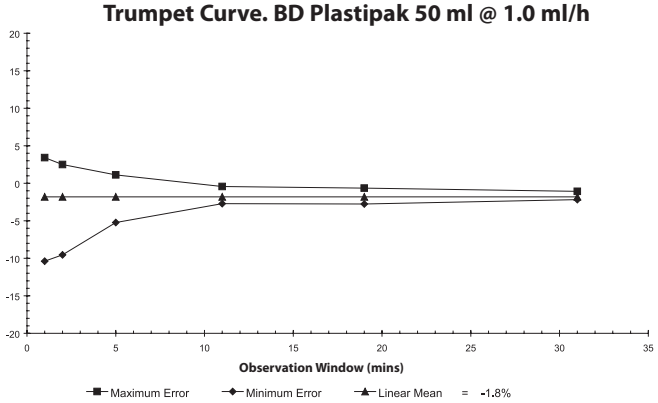
Trumpet Curve. BD Plastipak 50ml @ 0.1ml/h



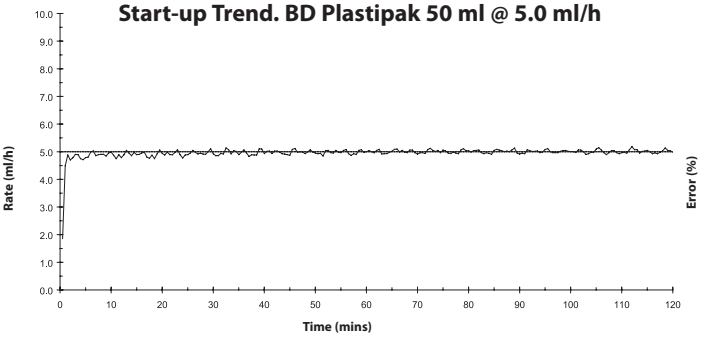
Start-up Trend. BD Plastipak 50 ml @ 1.0 ml/h



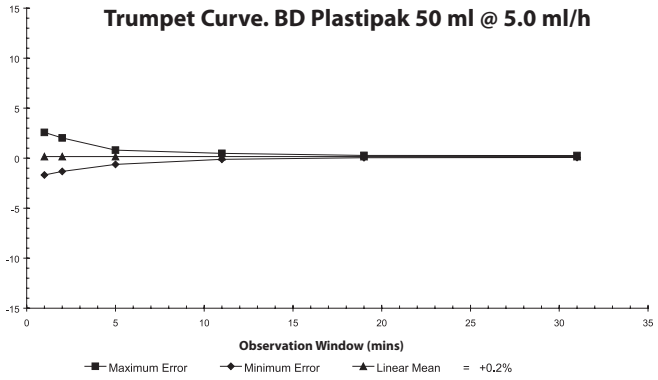
Trumpet Curve. BD Plastipak 50 ml @ 1.0 ml/h



Start-up Trend. BD Plastipak 50 ml @ 5.0 ml/h



Trumpet Curve. BD Plastipak 50 ml @ 5.0 ml/h



Alaris® Infusion System

Range of products in the Alaris® Infusion System product family are:

Part Number	Description
80023UN01	Alaris® GH Syringe Pump
80033UND1	Alaris® CC Syringe Pump
80043UN01	Alaris® TIVA Syringe Pump
80053UN01	Alaris® PK Syringe Pump
80033UND1-G	Alaris® CC Guardrails® Syringe Pump
80023UN01-G	Alaris® GH Guardrails® Syringe Pump
80263UN01-G	Alaris® GP Guardrails® Volumetric Pump
274	Alaris® Transporter
80083UN00-xx[1]	Alaris® DS Docking Station
80203UNS0x-xx[1]	Alaris® Gateway Workstation

[1] For Docking Stations and Workstation contact local customer services representative to obtain configurations availability and part numbers.

Spare Parts

A comprehensive list of spare parts for this pump is included within the Technical Service Manual.

The Technical Service Manual (1000SM00001) is now available in electronic format on the World Wide Web at :-

www.carefusion.co.uk/alaris-technical/

A username and password are required to access our manuals. Please contact local customer services representative to obtain login details.

Part Number	Description
1000SP01122	Internal Battery Pack
1001FAOPT91	AC Power Lead - UK
1001FAOPT92	AC Power Lead - European

Service Contacts

For service contact your local Affiliate Office or Distributor.

AE	***CN***	***GB***	***NZ***
CareFusion, PO Box 5527, Dubai, United Arab Emirates.	CareFusion, 上海代表机构，中国上海市张杨路 500 号， 上海时代广场办事处大楼， A 座，24 层， 邮编：200122。	CareFusion, The Crescent, Jays Close, Basingstoke, Hampshire, RG22 4BS, United Kingdom.	CareFusion, 14B George Bourke Drive, Mt Wellington 1060, PO Box 14-518, Panmure 1741, Auckland, New Zealand
Tel: (971) 4 28 22 842	电话：(86) 21 58368018	Tel: (44) 0800 917 8776	Tel: 09 270 2420 Freephone: 0508 422734
Fax: (971) 4 28 22 914	传真：(86) 21 58368017	Fax: (44) 1256 330860	Fax: 09 270 6285
AU	***DE***	***HU***	***PL***
CareFusion, 3/167 Prospect Highway, PO Box 355 Seven Hills, NSW 2147, Australia.	CareFusion, Pascalstr. 2, 52499 Baesweiler, Deutschland.	CareFusion, Döbrentei tér 1, H-1013 Budapest, Magyarország.	CareFusion, ul. Rzymowskiego 53, 02-697 Warszawa, Polska.
Tel: (61) 1800 833 372	Tel: (49) 931 4972 837	Tel: (36) 1 488 0232 Tel: (36) 1 488 0233	Tel: (48) 225480069
Fax: (61) 1800 833 518	Fax: (49) 931 4972 318	Fax: (36) 1 201 5987	Fax: (48) 225480001
BE	***DK***	***IT***	***SE***
CareFusion, Leuvensesteenweg 248 D, 1800 Vilvoorde, Belgium.	CareFusion, Firskovvej 25 B, 2800 Lyngby, Danmark.	CareFusion, Via Ticino 4, 50019 Sesto Fiorentino, Firenze, Italia.	CareFusion, Hammarbacken 4B, 191 46 Sollentuna, Sverige.
Tel: (32) 2 267 38 99	Tlf. (45)70 20 30 74	Tél: (39) 055 30 33 93 00	Tel: (46) 8 544 43 200
Fax: (32) 2 267 99 21	Fax. (45)70 20 30 98	Fax: (39) 055 34 00 24	Fax: (46) 8 544 43 225
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Tel: (1) 905-752-3333	Tel: (34) 902 555 660	Tel: +31 (0)30 2289 711	Tel: (1) 800 854 7128
Fax: (1) 905-752-3343	Fax: (34) 902 555 661	Fax: +31 (0)30 2289 713	Fax: (1) 858 458 6179
CH	***FR***	***NO***	***ZA***
CareFusion Switzerland 221 Sàrl Critical Care A-One Business Centre Zone d'activitiés Vers-la-Pièce n° 10 1180 Rolle / Switzerland	CareFusion, Parc d'affaire le Val Saint Quentin 2, rue René Caudron 78960 Voisins le Bretonneux France	CareFusion, Solbråveien 10 A, 1383 ASKER, Norge.	CareFusion, Unit 2 Oude Molen Business Park, Oude Molen Road, Ndabeni, Cape Town 7405, South Africa.
Ph.: 0848 244 433	Tél: (33) 1 30 05 34 00	Tel: (47) 66 98 76 00	Tel: (27) (0) 860 597 572 Tel: (27) 21 510 7562
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